June 30, 2006

The National Organic Standards Board
c/o Valerie Frances; Room 4008 - South Building
1400 and Independence Avenue, SW
Washington, D.C. 20250-0001.

Re: Comments on the NOSB Working Group Interim Final Report (Winter 2006)

Dear Ms. Frances:

Please accept our submission on the draft organic aquaculture standards currently under review at the NOSB. In this letter, we provide some overarching concerns on the issue of organic aquaculture and then provide specific comments about the standards. Overall, we are in support of organic aquaculture (especially for low food chain species (e.g. shellfish, herbivorous fish, etc.) grown in systems where inputs and outputs can be carefully controlled) and conclude that the standards are a solid first draft. However, we have considerable reservations about the concept of organic production concerning carnivorous species especially in open, net-pen systems where significant improvements are needed, particularly concerning the protection of wild ecosystems, human health, and feed procurement.

Additionally, as a conservation organization, we have concern on the make-up of the panel and its lack of conservation voices. Although we strongly support Dr. Rebecca Goldburg and the work that she has contributed to this process, we suggest that more conservation perspectives are needed to ensure that the standards are consistent with the overall principles of organic production and address the concerns of the broader conservation community (especially regarding issues with carnivorous aquaculture).

Our greatest concern with these standards is the lack of differentiation between the various types of aquaculture. We believe it is critical to differentiate the farming of carnivores in open systems (e.g. salmon, cod, halibut, and other species highly dependent on food derived from wild-caught fish) from other, more traditional aquaculture species grown in closed or semi-closed systems (such as tilapia and catfish) due to their inconsistency with the spirit of organic production as well as the numerous scientifically documented environmental impacts associated with this type of production (i.e. use of marine resources for feed, contaminants, escapes, disease and parasite transfer, release of chemicals and other drugs, and impacts on predators). At present, we conclude that closed-containment production practices are required to allow carnivorous aquaculture to be certified as organic as these would ensure farm outputs to be carefully controlled and resolve most, but not all, of the environmental issues associated with the industry.

The use of wild-caught fish for fish meal and fish oil poses several additional problems for the concept of organic carnivorous aquaculture. First, the term “organic” identifies a food product

that has been raised under farming practices that are under direct control of the farmer, as well as the requirement that feed inputs to the process itself be organically produced. Thus, "organic" by definition excludes wild-caught food stuffs including wild-caught fish destined to become fish meal and fish oil for carnivores. At present, there is simply no way to raise carnivorous species and be true to the broadly accepted definition of "organic". For this fundamental reason, we support Option B in the draft standard, which allows fish meal and oil only as feed supplements.

A second concern with the use of wild caught fish for feed is the future risk of depleting wild fisheries and their associated ecosystems. Although the use of fishmeal and fish oil per unit of production has declined in the salmon farming industry in recent years, a recent report found that at the current rate of expansion by the broader carnivorous aquaculture industry, the demand for fish oil is expected to outstrip supply within a decade, with a similar result for fish meal expected by 2050 (Naylor and Burke 2005).

A third concern surrounds the unavoidable levels of residual contamination in feed, which, because of expectations of consumers buying organic products, is likely the most important issue for organic aquaculture certification. Recent reports for farmed salmon have demonstrated contamination levels of concern to U.S EPA health standards. Although technology has recently been developed to remove contaminants from feed it remains to be seen how effective this will be at reducing contaminant levels to levels acceptable by organic standards.

At present, we also do not support the use of open, net-pen technology in organic aquaculture. Net-pens require a free flow of water from the cages to the surrounding marine environment and we do not believe this to be compatible with the principles of organics. The free flow of water also results in the export of nitrogenous waste beyond the farm site with little recycling and composting of waste within the farm, as expected in traditionally-defined organic production. In addition, scientific evidence suggests that even under stringent organic regulations (as well as with traditional net pen farming), using cage technology poses a significant risk to the marine environment. In addition to nutrient release, the risk of disease and parasite transfer to wild stocks is high and there is no scientific consensus currently on safe within-farm disease and parasite levels that protect both wild and farmed fish simultaneously. As such, we support the use of ponds, tanks and other production systems that are widely viewed as compatible with the principles of organic production.

At this time, we conclude that these issues cannot be sufficiently resolved to allow organic certification of farmed carnivores. We propose that organic certification for these species should be a long-term goal of the working group but that other aquaculture species (e.g. low trophic level, non-carnivorous species) should be encouraged now while the technical aspects of carnivorous production are addressed.

Finally, we are very concerned about the lack of specific language throughout the standards. There are too many qualitative clauses such as: “healthy”, “sustainable”, “proper care”, “minimize”, and “where possible” that remained undefined. Imprecise language creates significant “wiggle room” for the industry which may ultimately result in watered-down organic aquaculture standards that threaten the integrity of the entire U.S. organic movement. In short, to be meaningful, the standards must be clear, address scientific uncertainties, establish measurable benchmarks and targets for compliance, and outline mechanisms for enforcement.

Thank you for the opportunity to comment on these draft standards and for the ongoing hard work of the Working Group on this important issue. We look forward to reviewing the next version of the standards once they are available. Please don’t hesitate to contact us should you have questions or comments.

Regards,

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Specific Comments on the Standards (in order of appearance)

Issue 1: § 205.250 Aquaculture general.
Aquatic animals, aquatic animal products, aquatic plants, and aquatic plant products to be sold, labeled or represented as "100 percent organic," "organic," or "made with organic (specified ingredients or food group(s))," must be produced and handled in accordance with this section: Except that the requirements of Sections § 205.236 through § 205.239 shall not apply to the production of aquatic animals or aquatic animal products and the requirements of Sections § 205.202 through § 205.206 shall not apply to the production of aquatic plant or aquatic plant products.

MBA COMMENT: We suggest that labels for the final product must distinguish between farmed and wild production. The specific label is not mentioned in the standards. For example, we propose product be labeled "organic farmed salmon" rather than "organic salmon".

Issue 2:
Aquaculture facilities shall be designed and operated to minimize the release of nutrients and wastes into the environment. The use of water discharges and filtered metabolic products as nutrients for vascular plants in agricultural crops and constructed wetlands is encouraged to be included in organic production system plans. However, the amounts of such discharges and filtered products applied shall not exceed the requirements of targeted plants in the receiving area, and excessive amounts shall not be discharged into unplanned areas. Vascular agriculture crops using nutrients from certified organic aquaculture operations may be certified organic if in compliance with other regulations in this Subpart.

MBA COMMENT: The language on this regulation is too vague (e.g. "minimize"). Certain types of aquaculture (e.g. open, net-pen finfish operations) are known to release large quantities of waste and nutrients into the environment (see Lee *et al.* 2006 for extensive references). A strict measurable benchmark is required for this standard to be effective and will likely need to be tailored for each species under production. In addition, a methodology to account for the potential uncertainty or lack of scientific information on "the requirements of targeted plants" needs to be considered and will be required where other areas of scientific uncertainties exist.

Issue 3:
Metabolic products of one species are recognized as organic resources for one or more other species in an aquaculture production system. Metabolic products of aquaculture species are not considered animal manure under § 205.2, Terms Defined, Manure, and § 205.239 (c) Livestock Living Conditions. Facilities producing aquatic animals must incorporate measures to recycle or biologically process a significant portion of these metabolic products. Where possible, the practice of polyculture of two or more different

species grown in the same body of water is encouraged, as is the integration of additional species as water moves through the aquaculture facility or is discharged from it. The use of culture water and associated solid and dissolved constituents for the irrigation of organically produced terrestrial plant corps is encouraged. Aquaponics, the combination of aquaculture and plant hydroponics, is encouraged in organic aquaculture production systems.

MBA COMMENT: Polyculture or recycling of nutrients is an excellent way to address the excessive nutrient and waste issues of certain types of aquaculture. However, polyculture in conjunction with the farming of carnivores could have secondary contamination issues associated with the contaminated feed used and procedures should be developed to ensure contamination doesn't occur when polyculture is employed.

Issue 4:
Biodiversity of natural aquatic ecosystems, functional integrity of aquatic environments, and the quality of surrounding aquatic and terrestrial ecosystems must be protected. All aquatic animals possessed and grown at an aquaculture facility must be in compliance with all applicable local and national laws.

MBA COMMENT: How will "biodiversity," "functional integrity," and "ecosystem quality" be operationally defined and monitored for impacts? Diversity and functional integrity of ecosystems are concepts of considerable debate between the aquaculture industry and conservationists. Given the importance of these standards, clear definitions, and appropriate measures for monitoring and addressing potential impacts are required.

Issue 5:
Adequate measures shall be taken to prevent escapes of cultivated animals and plants from the aquaculture facility and to document any that do occur.

MBA COMMENT: Ambiguous terminology (e.g. "adequate") must be removed from the standards to ensure their long-term integrity and congruence with accepted principles of organic production. Differences in what constitutes "adequate" in the eyes of the aquaculture industry and the conservation community should be considered. With finfish aquaculture, there are two types of escape events (low level, constant "leakage" and massive or catastrophic events). Two sets of regulations are required to adequately address both these events.

As written, this standard is similar to those that currently exist and its codification in organic production will enact the same risks on wild systems as conventional farming practices. For salmon farming in the Pacific Northwest, these standards have allowed the escape of over 1,000,000 Atlantic salmon and native but domesticated species into Pacific Ocean waters in the past decade. Atlantic salmon have been caught as far away as the Alaskan Peninsula, even though no salmon farming occurs in Alaska (due to a state-wide ban). In addition, there is some evidence that escaped Atlantic salmon can adapt to the wild in the ocean and have the ability to

impact native, wild populations of salmon (e.g. Moring 1989; Gausen and Moen 1991; Einum and Fleming 1997; Fleming *et al.* 2000; Morton and Volpe 2002; Volpe *et al.* 2000; Volpe *et al.* 2001).

§ 205.251 Origin of aquaculture animals.

Issue 6:
(i) In cases where hatchery progeny of aquatic animals are not commercially available, broodstock may be collected from the wild provided that they are collected in a sustainable manner, and where appropriate, in collaboration with government agencies, to assure that natural populations and the collected individuals are protected and that biodiversity in the ecosystem is supported.

MBA COMMENT: The definition of "sustainable" can be variable among participants in the aquaculture debate. A robust definition is needed to ensure integrity with these standards and consistency with the broader organic movement. Government agencies are more likely to manage ecosystems for economic benefits rather than ecosystem function. Empowering government agencies to be the sole protector of biodiversity is potentially problematic and should be given more careful scrutiny.

§ 205.252 Aquaculture feed.

Issue 7:
(c) Feeds for aquaculture products for human consumption must assure high human food safety standards and healthfulness.

MBA COMMENT: What standards will be used to enforce this regulation? There is controversy over which is the best health standard (EPA vs. FDA vs.WHO). Recent reports have demonstrated elevated levels of toxins (PCB's, dioxins, and flame retardants) in farmed salmon (e.g. Hites *et al.* 2004). This is the inevitable result of "bio-magnification" which will continue to be problematic until contaminants in fish meal and fish oil are substantially reduced. Recent developments in technology have demonstrated the potential for feeds to be decontaminated but it is too early to tell how this will translate to contaminant levels in the final product.

Issue 8:

General comments on feed:

Farming carnivores

The most serious issue for organic aquaculture concerns the farming of carnivorous finfish (e.g. salmon, halibut, etc.). Leading scientists have warned about the inherent unsustainability of "farming up the food web", because of the inefficient and wasteful use of marine resources, all of which are already used by humans (commercially) and other organisms (Pauly *et al.* 2002; Pauly *et al.* 2005). Additionally, although some would argue that some reduction fisheries are sustainable, present fisheries science models give little consideration to the importance of small pelagic fish in the wider ecosystem (Tacon 2005). The ecosystem sustainability of reduction fisheries must be resolved before species heavily dependent on these feed inputs can be certified as organic.

Farming carnivores is inherently inefficient because wild fish inputs are larger than farmed fish outputs (Pauly *et al.* 2002). Carnivorous aquaculture has experienced a sharp rise in production levels over the last several decades and while aquaculture has historically added to global seafood supplies, the growing trend of farming carnivores threatens to erode this net protein gain (Naylor *et al.* 1998; Naylor *et al.* 2000). Naylor and Burke (2005) have suggested that if the farming of carnivorous fish continues to grow at its current rate, the demand for fish oil is expected to outstrip supply within a decade, with a similar result expected for fish meal by 2050.

Alternative feeds

The predicament of carnivorous aquaculture relates to the use of fish meal and fish oil which are required for fish energy needs, health, and palatability (Naylor *et al.* 2000). Tacon (2005) suggested that although salmonids *do not* have a specific dietary requirement for a particular ingredient such as fishmeal or fish oil (i.e. the diets of wild fish consist mainly of crustaceans, mollusks, and benthic organisms), fishmeal and fish oil has a nutritional profile that best represents the known dietary requirements of salmonids, and as such, usually has a high value for salmonids compared to other non-marine animal feeds.

Although the overall use of fish meal and fish oil has declined for the salmon aquaculture industry in recent years, it is not currently possible to completely eliminate their use without negatively impacting fish welfare or their nutritional profile. Theoretically, formulating feeds to a specific nutrient profile should be possible and while this has been found to be possible in the case of fish meal, it has been more problematic for fish oil where there are no commercial alternatives (of sufficient commercial scale of production) currently available (Tacon 2005).

Overall, we support "option B" as we conclude that wild fisheries can not be certified as "organic" and thus traditional wild-caught feed should only be allowed for use as a feed supplement in organic production. At present, this would limit the use of organic to non-carnivorous aquaculture , which closely matches the philosophy of the broader organic

movement and avoids dealing with the serious issues of sustainability associated with the carnivorous finfish aquaculture sector.

§ 205.253 Aquaculture health care.

Issue 9:
(4) Establishment of biosecurity measures to limit entry of pathogens into the aquaculture production system and operational procedures and sanitation practices to minimize the occurrence, transmission, and severity of disease epizootics.
Biosecurity measures should not be used as an approach to compensate for growing conditions that compromise aquatic animal health from elevated stress and associated immunosupression;

MBA COMMENT: This standard will be very difficult to enforce given the vagueness of the language (e.g. "limit entry of pathogens," "minimize the occurrence"). In fact, as written, this is no different than current aquaculture standards as it is in the best interests of the company to "limit" pathogen entry and "minimize" their development. This is especially problematic when using open, net-pen systems as scientific evidence suggests that open net-pens can have significant problems with disease and parasite outbreaks, which can threaten both the farmed fish and wild species in adjacent waters (Tully *et al.,* 1993; Tully *et al.,* 1999; Bjorn *et al.,* 2001; Bjorn and Finstad, 2002; Morton and Williams 2004; Morton *et al.* 2004; Krkosek *et al.* 2005; Morton *et al.* 2005).

Open net-pen aquaculture requires a complete free flow of water from the cage to the surrounding aquatic environment to assure the health of the fish (e.g. oxygen levels, waste removal, etc.). Methods to substantially limit pathogen entry would likely have an impact on the overall health and living conditions of the fish by reducing this free flow of water.

For this standard to be effective, specific parameters and methods of pathogen prevention need to be specified, possibly on a species-by-species basis. Farm stocking densities should be set within these standards and research will be required to demonstrate the maximum levels for stocking densities within the context of the natural host-parasite relationships (disease and parasites) in the local farming region. Additionally, specific standards must be set for disease and parasites levels, although more scientific inquiry is required before rigorous parasite and disease protocols can be agreed upon.

Issue 10:
(4) Administer synthetic parasiticides;

MBA COMMENT: We are opposed to the use of any chemicals, drugs, or parasiticides in organic aquaculture. Any consideration for their use should be based on the level of scientific

certainty for impact on marine ecosystems given that chemicals approved for use on terrestrial systems may not have the same potential for impact if used in marine systems. Chemical theurapeutants (emamectin benzoate or ivermectin) used in salmon aquaculture have been shown to negatively affect marine invertebrate communities (e.g. Collier and *Pinn* 1998; Waddy *et al*. 2002). We do not endorse their use in organic aquaculture.

Issue 11:
§ 205.254 Aquaculture living conditions.

(b) The culture system must be managed to minimize the risk of losses of cultured stock and stress to cultured aquatic animals caused by predators. Organic aquaculture facilities must develop an integrated predator deterrence plan that identifies potential predators, appropriate deterrence methods, how predator behavior will be modified by application of deterrence methods, contingencies for failure of the plan to achieve objectives, and documentation of control methods and effects. Examples of such control measures include site selection, physical barriers, repellents, and legal predator deterrence methods. Lethal measures may be taken only when predators threaten human safety or are necessary for predator welfare (e.g. birds are entangled and injured) and must include appropriate documentation. Lethal measures must be in compliance with local laws and the laws of the United States.

MBA COMMENT: Serious consideration must be given to this standard, especially for open net-pen finfish operations. The use of predator nets in open net cages still results in strong visual and olfactory clues to predators. Salmon farming has a well-documented history of negative interactions with seals, sea lions, and birds. Acoustic underwater devices utilized by salmon farms for predator avoidance have been found to cause behavioral changes in acoustically-sensitive animals (Morton and Symonds 2002).

Issue 12:
(c) Non-organic aquatic animals may be used in aquaculture production systems for controlling pests, such as weeds, snails, and algae. Triploid animals may be employed provided that the animals are legal to culture, are not labeled organic, and are readily separated at harvest from the aquatic animals under organic management.

MBA COMMENT: There is no mention here of requiring the use of only indigenous species in aquaculture or of regulations to prevent the introduction of exotic species into ecosystems. "Legal to culture" does not explicitly prohibit the use of exotic species (e.g. Atlantic salmon in the Pacific Ocean), a concept that we support and one which the NOSB should give considerable discussion.

Issue 13:
§ 205.255 Aquaculture facilities.

(a) Location of organic aquaculture facilities shall take into consideration the maintenance of the aquatic environment and surrounding aquatic and terrestrial ecosystem.

MBA COMMENT: A clear definition of the "maintenance of the aquatic environment" is required here. Specification of an enforcement program is also needed as there is likely to be a high level of uncertainty associated with making such an assessment.

Issue 14:
(d) Organic aquaculture facilities shall be at appropriate distances from potential contamination sources including pesticide drift and other possible contaminants from conventional aquaculture.

MBA COMMENT: How will appropriate distances be determined in the absence of hard science on these issues? This requires careful consideration.

Issue 15:
(f) Potentially adverse environmental impacts from aquaculture production must be minimized. The rate of effluent discharge must not exceed the natural assimilative capacity of an area within 25 meters of the site boundary nor contribute significantly to environmental degradation beyond 25 meters of the site boundary. For the purpose of this paragraph, "site" is the area licensed or leased by government authorities, or other parties, for the aquaculture facility.

MBA COMMENT: Again how does one measure the natural assimilative capacity of an ecosystem in the absence of hard science relevant to the specific farming areas?

Issue 16:
(j) Cultured organisms that are species-distinct or genetically-distinct populations from native organisms in adjacent aquatic environments must be managed with appropriate security measures (mechanical, physical, and biological barriers) to eliminate to the extent practical escapes due to predators, adverse weather conditions (including floods), or facility damage. The facilities must include preventative measures against possible escapes into the natural environment of the aquatic animals in production, including during local floods. A containment management plan must describe measures to prevent escape, procedures to detect and document escapes should they occur, and actions to be undertaken in the event of escape.

COMMENT: Please see our previous comments on the risk of escapes, above.

Issue 17:
(k) Open water net-pens and enclosures are permitted where water depth, current velocities and direction, stocking densities, and other factors act to adequately disperse

metabolic products in order to minimize accumulation of discharged solids on the bottom sediments under the net pens. However, water currents should not be excessive to cause the fish to expend excessive energy to swim and to be unable to consume food. Monitoring shall be employed to ensure that the natural assimilative capacity at the site is not overburdened. Facility managers shall take all practicable measures to prevent transmission of diseases and parasites between cultured and wild aquatic animals. Use of multiple species of aquatic plants and animals to recycle nutrients must be included in every management plan. Except as may be provided in § 205.601 or § 205.602, chemical treatment of biofouling organisms on nets is not allowed. An organic conversion period of at least one year, or one crop cycle, whichever is less, shall be required.

MBA COMMENT: Open net-pen aquaculture requires the free flow of water through the pens to allow healthy fish and optimal rearing conditions. The available science suggests that this flow poses several risks with the surrounding environment including: escapes, nutrient and waste pollution, disease and parasite amplification and transfer, negative impacts on predators, and the release of chemicals into the environment. All of these issues are unlikely to be mitigated without strict well-defined standards that have measurable objectives that are monitored for compliance and progress periodically.

Issue 18:
(4) stocking density levels that take into consideration animal health and overall well-being, including the natural schooling characteristics of the species.

MBA COMMENT: This standard should also consider the maximum threshold for salmon densities in the area that can be present without dramatically altering the natural host-parasite/disease relationships of the area.

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1: References cited in this section are not all cited in the text but are cited as additional references in support of statements made within the document.